

Procedure Specific Simulation: The Future of Robotic Surgery Training

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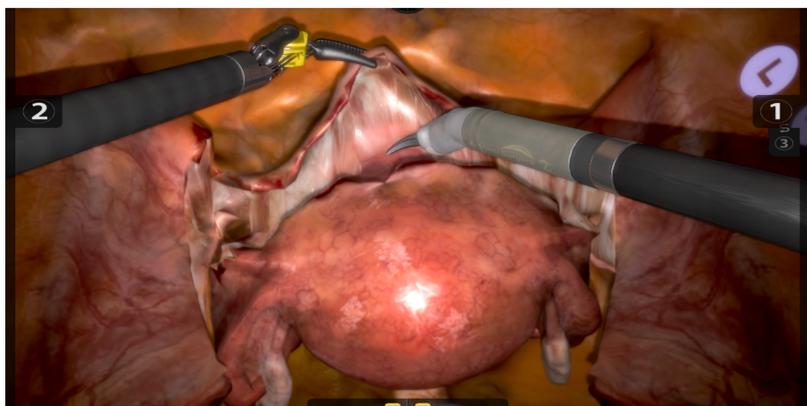
R&D, 3D Systems Corporation, USA

Robot-Assisted Laparoscopic Surgery (RALS) is rapidly gaining momentum as an approach for minimally invasive surgery. A common approach to practice RALS is to use virtual reality simulation for a set of fundamental tasks involving the manipulation of basic objects. Virtual reality simulation, however, can be used to develop more advanced Procedure Specific Simulations (PSS) that mimic an entire surgical procedure. We have been working on the development of a broad range of PSS for the practice of various surgical procedures using the **RobotiX Mentor™**, a comprehensive simulator for RALS practice.

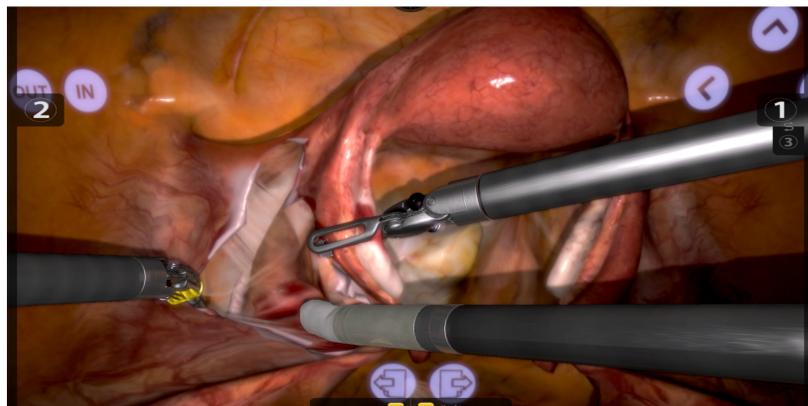
In contrast with basic simulation, PSS provides a VR anatomical environment in which to practice real world scenarios that serve not only to improve surgical skills but to enhance clinical knowledge of the procedures. PSS, therefore, is a powerful tool for training surgeons of all skill levels. Just as virtual reality training simulation has become standard in other fields such as aeronautic training, the future goal is for this technology to serve as a complementary component in surgical training.

Procedure Specific Simulation: RobotiX Hysterectomy

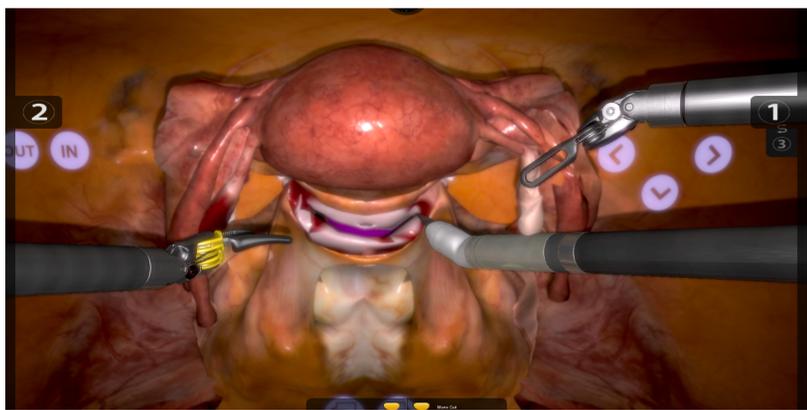
Hysterectomy is the surgical removal of the uterus. It is the most commonly performed gynecological surgical procedure. Robotic-assisted hysterectomy has been receiving more attention due to lower levels of post-operative discomfort and faster recovery times (**9.5% performed robotically in 2010, up from 0.5% in 2007**).



Bladder Mobilization



Ureter Dissection 1



Colpotomy

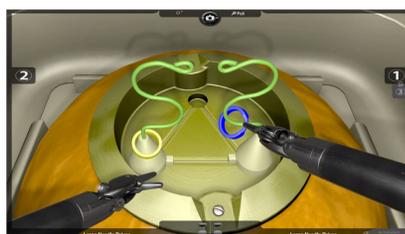


Snapshot from a real robotic assisted hysterectomy

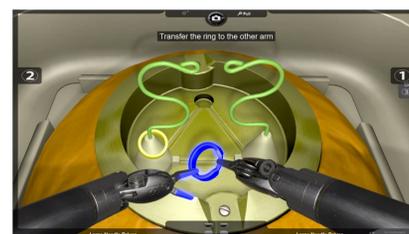
Example of Basic Skills: Fundamental Robotic Surgery (FRS), Ring Tower Transfer Task



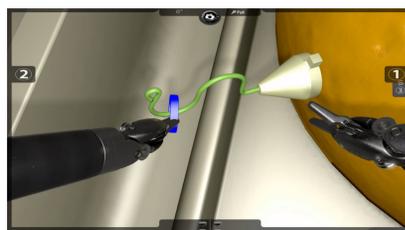
RobotiX Mentor™, a comprehensive simulator for RALS practice



1 Pick up the ring and remove it from the tower without touching the wire.



2 Transfer the ring to the opposite hand in mid-air.



3 Place the ring on the side tower without touching the wire.



Physical model